

PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of

Harold A. Rosen et. al

Serial No. Not Known

Filed: Herewith

For: LIGHT WEIGHT HYDROGEN TANK

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September 25, 2001
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Signature

PRELIMINARY AMENDMENT

Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Sir:

Prior to the examination of the above-identified continuation application, please enter the following amendment.

In The Specification:

Page 1, before the first line, add the following:

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation of United States Patent Application Serial No. 09/615,671 filed on July 14, 2000, the entire contents of which are incorporated herein by reference.

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In The Claims:

Cancel claims 2-11.

Add the following new claims 12-39.

12. (New) A lightweight fuel tank comprising:

an outer spherical shell member;

an inner spherical shell member positioned inside said outer shell member;

and

said inner shell member and said outer shell member being positioned to provide an insulating radial gap between them; and

a first port member in said outer shell member for evacuation of said radial gap to a vacuum, and to provide access for filling said inner shell member with hydrogen material;

said inner shell member having an outer surface and an inner surface, said outer surface being coated with a low emissivity material;

said outer shell member having an outer surface and an inner surface, said inner surface being coated with a low emissivity material.

13. (New) The lightweight fuel tank as set forth in claim 12 further comprising a first heating mechanism on said outer shell member for controlling the rate of evaporation of material contained in said inner shell member.

14. (New) The lightweight fuel tank as set forth in claim 13 comprising a second heating mechanism on said outer surface of said outer shell member for controlling icing of said fuel tank during use.

15. (New) The lightweight fuel tank as set forth in claim 12 wherein said outer shell member is a sandwich construction employing low heat conducting skin and core materials.

16. (New) The lightweight fuel tank as set forth in claim 12 wherein said low emissivity material is a flash of a copper material.

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17. (New) The lightweight fuel tank as set forth in claim 12 further comprising a second port member in said inner shell member for filling said inner shell member with a hydrogen material, said second port member having a valve mechanism.

18. (New) A lightweight fuel tank comprising:
an outer spherical shell member;
an inner spherical shell member positioned inside said outer shell member;
said inner shell member and said outer shell member being positioned to provide an insulating radial gap between them;
said inner shell member having an outer surface and an inner surface, said outer surface being coated with a low emissivity material; and
said outer shell member having a sandwich construction with an inner skin member made of a lightweight metal material, an outer skin member made of a lightweight composite material, and a core member made of a low thermal conduction insulating material.

19. (New) The light weight fuel tank as set forth in claim 18 further comprising a first heating mechanism on said outer shell member for controlling the rate of evaporation of material contained in said inner shell member.

20. (New) The light weight fuel tank as set forth in claim 19 comprising a second heating mechanism on said outer surface of said outer shell member for controlling icing of said fuel tank during use.

21. (New) The lightweight fuel tank as set forth in claim 18 wherein said inner skin member is an aluminum material, said outer skin member is a Kevlar material, and said core member is a low density foam material.

22. (New) The light weight fuel tank as set forth in claim 18 wherein said inner shell member is made of an aluminum material and said outer shell member is made of a sandwich of titanium, Kevlar and Nomex materials.

23. (New) The light weight fuel tank as set forth in claim 18 wherein said low emissivity material is a flash of a copper material.

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24. (New) The light weight fuel tank as set forth in claim 18 wherein said inner skin member is coated with a low emissivity material.

25. (New) The light weight fuel tank as set forth in claim 24 wherein said low emissivity material is copper.

26. (New) The light weight fuel tank as set forth in claim 18 further comprising a first port member in said outer shell member for evacuation of said radial gap to a vacuum, and to provide access for filling said inner shell member with hydrogen material.

27. (New) The light weight fuel tank as set forth in claim 26 further comprising a second port member in said inner shell member for filling said inner shell member with a hydrogen material, said second port member having a valve mechanism.

28. (New) The light weight fuel tank as set forth in claim 18 wherein said inner and outer shell members are connected at three locations, namely two opposing equatorial external support positions and a port member.

29. (New) The light weight fuel tank as set forth in claim 18 wherein said inner and outer shell members of different materials are connected by a friction welded insert member.

30. (New) A lightweight fuel tank comprising:
an outer spherical shell member;
an inner spherical shell member positioned inside said outer shell member;
said inner shell member and said outer shell member being positioned to provide an insulating radial gap between them; and

a first heating mechanism on said outer shell member for controlling the rate of evaporation of material contained in said inner shell member.

31. (New) The lightweight fuel tank as set forth in claim 30 further comprising a second heating mechanism on said outer shell member for controlling icing of said fuel tank during use.

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32. (New) The lightweight fuel tank as set forth in claim 30 further comprising a port member in said outer shell member for evacuation of said radial gap to a vacuum.

33. (New) The lightweight fuel tank as set forth in claim 30 further comprising a port member in said outer shell member for filling said inner shell member with hydrogen material.

34. (New) The lightweight fuel tank as set forth in claim 30 further comprising a coating of a low emissivity material on the outer surface of said inner shell member.

35. (New) The lightweight fuel tank as set forth in claim 30 further comprising a coating of a low emissivity material on the inner surface of said outer shell member.

36. (New) The lightweight fuel tank as set forth in claim 34 wherein said low emissivity material is a flash of a copper material.

37. (New) The lightweight fuel tank as set forth in claim 35 wherein said low emissivity material is a flash of a copper material.

38. (New) The lightweight fuel tank as set forth in claim 30 wherein said outer shell member is a sandwich construction employing a low heat conducting skin and core materials.

39. (New) The lightweight fuel tank as set forth in claim 30 wherein said outer shell member has a sandwich construction with an inner skin member made of a lightweight metal material, an outer skin member made of a lightweight

composite material, and a core member made of a low thermal conduction insulation material.

Respectfully submitted,

Dated: September 25, 2001

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"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

In the Specification:

Page 1, before the first line, the following has been added:

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation of United States Patent Application Serial No. 09/615,671
filed on July 14, 2000.

In The Claims:

Claims 2-11 have been cancelled.

Claims 12-39 have been added.

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